

DRAFT Potential Areas of Analysis

Potential Analyses	Potential Emissions Impact	Potential Analysis Tasks	Potential Data Sources	Estimated Resources for Analysis
<p>What happens to vehicles that do not complete the Smog Check requirements? Do these vehicles continue to operate in program areas? In what way does Smog check contribute to vehicle attrition?</p> <p><i>Examples of specific questions to be answered:</i></p> <ul style="list-style-type: none"> - What is the emissions impact of both short- and long-term unregistered vehicles (how many, VMT, likely high emitters)? - What is the emissions impact of the scrap programs? - What is the emissions impact of vehicles removed from the road because of the Smog Check program? 	High	Merge non-complying vehicles with RSD data to determine if those vehicles continue to operate in program areas.	Smog Check data and recent RSD data	Low
		Merge non-complying vehicles with DMV data on registrations. Determine if vehicles have changed residence/ownership or if they have been registered without Smog certificate.	Smog Check data and DMV Data	Moderate
		Perform historical vehicle pathway analysis for vehicles receiving initial tests. Determine what fraction pass, receive a cert, and never show up in the data again. This could establish a "baseline" scrap rate by model year. A related analysis would look at failures that did not receive a cert to determine if they entered back into the program at a later date.	Smog Check Data	Low
<p>Are vehicles are being tested with TSI when VID indicates ASM is required? What is the cause and what is the percentage difference by station type?</p> <p><i>Examples of specific questions to be answered:</i></p> <ul style="list-style-type: none"> - In what percent of vehicle inspection cycles does the vehicle test type change? - How much potential emissions reduction are lost when a technician chooses to administer the incorrect test type to achieve a passing score in spite of an emissions defect? 	Moderate	Analyze Smog Check database to determine impact. Perform analysis by station type, by individual stations, and by individual technicians.	Smog Check data	Moderate
<p>Are test aborts being used to affect test results? How do abort rates differ between station types, individual technicians, and equipment manufacturers?</p> <p><i>Examples of specific questions to be answered:</i></p> <ul style="list-style-type: none"> - How much potential emissions reduction are lost when a technician administers multiple successive tests to a vehicle in hopes of achieving a passing score in spite of defects? - How much potential emissions reduction is lost due to excessive warm-up after aborted tests? 	Moderate	Analyze Smog Check database to determine impact. Perform analysis by station type, by individual stations, by individual technicians and by equipment manufacturer.	Smog Check data	Low

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<p>Which stations and station types deliver the best performance in terms of identifying high emitting, tampered, or defective vehicles during initial inspection?</p> <p>Examples of specific questions to be answered:</p> <ul style="list-style-type: none"> - How does each specific vehicle's history affect the likelihood that it will fail future Smog Check inspections? - How does specific vehicle model-based characteristics affect expected failure rates? - How do previous repairs and the amount invested in previous repairs affect expected failure rates? - How do owner habits, such as shopping for specific Smog Check results, affect expected failure rates? - How do motorist socioeconomic factors affect expected failure rates? - What would the effect be on the program if all high emitting vehicles/GPs were tested by top performing stations? - What would the effect be on the program if only Smog Check stations that met minimum performance criteria were allowed to certify vehicles. 	High	<p>Perform sensitivity analysis to determine which factors form the best predictors of expected failure rates. Factors should be weighted according to their significance. Among the factors to be considered should be: previous test results, pretests, repair dollars spent, appropriateness of repairs, time from initial to final inspection, time unregistered, previous station performance, basic/enhanced on previous inspection, vehicle specific cutpoint stringency, make/model/model year history, multiple stations during previous cycle, odometer, mileage accumulation since last inspection, multiple fails on previous inspection, wrong test type, previous station type, previously high emitter, previous tampers, previous catalyst repairs, socioeconomic factors.</p> <p>Using regressed factors from above, identify top performing stations absent biasing factors mentioned above.</p>	Smog Check data	High
<p>Which stations and station types deliver the best performance in terms of failures and after-repair emission rates, both immediately after repairs and during subsequent emission cycles?</p> <p><i>Examples of specific questions to be answered:</i></p> <ul style="list-style-type: none"> - How often are short-term repairs made to get the vehicle through the inspection cycle without making appropriate repairs (e.g. catalyst replacement)? - Are certain vehicle models more prone to be gross polluters in spite of reasonable repairs? Which models? - To what extent would tighter repair cutpoints improve repair durability? - What pathways and processes generate the most durable repairs? - Which factors affect between-inspection deterioration following repair? - Is it possible to quantify pre-inspection repairs, and if so, what is the impact? 	High	Analyze Smog Check database to determine impact. Normalize station results according to sensitivity analysis results to be determined in the previously described potential analysis.	Smog Check data BAR Enforcement	Low
		Track next-cycle failure rates as a function of where the vehicles were certified (TST, REG, or GPC). If the fraction of repeat failures is high for certain station types, it would point to areas of potential improvement.	Smog Check data	Moderate

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<p>Why does 40% of the fleet that fails the initial test and goes on to receive a Smog Check certificate fail at the roadside within a year?</p> <p><i>Examples of specific questions to be answered:</i></p> <ul style="list-style-type: none"> - How do improper tests or repairs contribute to this issue? - How does motorist behavior contribute to this issue? - How does technician competence contribute to this issue? - What portion of above 40% resulted from the same failure modes? - What portion of above 40% consists of vehicles in which the cost of complete repair is on par with the value of the vehicle? 	High	Merge the roadside data with historical Smog Check data. Assess prior inspection results based on potential vehicle pathways through the program (e.g., directed/non-directed, test type, station type, test result, etc.). Attempt to determine if specific vehicle pathways are an issue or whether particular make/model/year/odometer groups are an issue.	Smog Check data and roadside data	Moderate
<p>What is the emissions impact of improper testing / certification activity?</p> <p><i>Examples of specific questions to be answered:</i></p> <ul style="list-style-type: none"> - What are the effects of the following: <ul style="list-style-type: none"> * Clean-piping * Clean-capping (fuel cap) * Clean-scanning (OBDII) * Incorrect test type * Engine RPM deviations 	High / Moderate	Using Smog Check data, investigate the degree to which vehicles are improperly passed as well as the emissions impact and the frequency of occurrence.	Smog Check data	High
<p>Is there any way to encourage or incentivize more thorough and effective repairs?</p> <p><i>Examples of specific questions to be answered:</i></p> <ul style="list-style-type: none"> - Technician incentives - Station incentives - Motorist incentives - How often are recommended repairs declined by the motorist? 	High / Moderate	Focus groups/surveys might be able to generate ideas for motivating both the repair industry as well as the public to seek more than the minimum repair.	Data would have to be generated.	High